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Organoleptic evaluation of mushroom powder fortification in Rava Idli and Mathari

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In India, there are mainly three species of mushrooms, namely, white button mushroom (*Agaricus bisporus*), oyster mushrooms (*Pleurotus sajor* caju) and paddy straw mushrooms (*Volvariella valvacea*), that are grown commercially. Among these, oyster (*Pleurotus sajor* caju) mushrooms possess unique nutritional and medicinal values, characteristic aroma and taste. Two products mathari and rava idli were prepared using prepared mushroom powder by oven dried method. The level of mushroom fortification in developed products were T_1(5%),T_2(10%),T_3(15%) and T_4(20%). The products were analyzed for its organoleptic characteristics. Analysis of variance revealed that 10 per cent fortification of mushroom powder in mathari was liked very much whereas 20 per cent fortification of mushroom powder in rava idli was liked extremely (by hedonic scale). This study shed light on the evaluation of organoleptic acceptability of mushroom powder as an important food supplement. The study indicates that mushroom powder could be applied in various Indian recipes as an excellent functional and nutritional food.

Key Words : Oyster mushrooms (*Pleurotus sajor caju*), Indian recipes, Fortification, Organoleptic acceptability, Oven Drying, Rava, Besan, Refined flour

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INTRODUCTION

Mushrooms are edible fungi and assume considerable importance in the human diet as they are rich in non-starchy carbohydrates, dietary fibre, minerals, and vitamin-B and are quite low in fat value. Most developing countries like India look forward to solving the acute protein deficiency in the diets of its increasing population. This has led food scientists to seek new sources of protein (Gupta *et al.*, 2004). Numerous mushroom-based 'healthy' products for direct use are available on the market; many patents propose use of medicinal mushrooms and/or their products as additives to food. This seems to be a very convenient and simple method for delivering healthy ingredients to the consumers and, at the same time, enhancing the flavour of the food products.

The present study was carried out in the Department of Food Science and Nutrition, M.A.B. College of Home Science, C.S. Azad University of Agriculture and Technology, Kanpur.

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METHODOLOGY

Development of products :

Preparation of Rava Idli :

Fortified rava idli in which rava and besan was

replaced by mushroom powder at different levels as 5 per cent, 10 per cent, 15 per cent and 20 per cent were prepared with using other ingredients (Table A and Fig. A).

Table A : Recipe for mushroom powder fortified Rava Idli (g)

Ingredients	Control	T_1	T_2	T_3	T_4
Rava	67	63	60	57	54
Besan	33	32	30	28	26
Mushroom powder	-	5	10	15	20
Curd	2 tsp.	2 tsp.	2 tsp.	2 tsp.	2 tsp.
Salt	According to taste				

Fig. A : Mushroom powder fortified Rava Idli

Method:

– Rava and besan (2:1 ratio) was taken in a bowl.

– 2 tsp. of curd was added in it and also water if necessary.

– Slurries was combined to form a thick batter and mixed well.

– Salt for seasoning (Approximately 1% v/v) was added in batter.

– Then, the batter was kept at room temperature over night for fermentation. After desired fermentation, the batter was poured into small cups in idli cooker.

– Then it was steamed for 10 minutes.

Preparation of Mathari :

Fortified mathari in which refined flour was replaced by mushroom powder at different levels as 5 per cent, 10 per cent, 15 per cent and 20 per cent were prepared with using other ingredients (Table B and Fig. B).

Method :

– Refined flour was taken and sieved.

Table B : Recipe for mushroom powder fortified Mathari (g)

Ingredients	Control	T_1	T_2	T_3	T_4
Refiend flour	100	95	90	85	80
Mushroom powder	-	5	10	15	20
Azwain	1 tsp.	1 tsp.	1 tsp.	1 tsp.	1 tsp.
Hydrogenated fat	50	50	50	50	50
Salt	According to taste				

Fig. B : Mushroom powder fortified Mathari

– Salt and ajwain was added in flour.

– Then hydrogenated fat was added and mixed well.

– All ingredients were kneaded into soft dough using required water and then equal sizes of balls were made by them.

– Balls were made into different shape as like and then deep fried.

Organoleptic evaluation of prepared products :

The acceptability of mushroom fortified based rava Idli and mathari were evaluated by 5 judges using a 9-point hedonic scale to test the liking or disliking of developed products. The Panelist was asked to record the level of liking or disliking by giving marks for various characteristics of the product. Assigned marks by the panel members for each parameter of the products were averaged and considered to compare the acceptability of products.

Statistical analysis:

The data obtained in present investigation were tabulated were analyzed statistically by using CRD (Completely Randomized Design).

OBSERVATIONS AND ASSESSMENT

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Organoleptic acceptability of mushroom fortified Rava Idli :

Taste and flavour profile:

Table 1 shows that mean score of control sample was 9.0 while the mean value of T_1 (5%), T_2 (10%), T_3 (15%) and T_4 (20%) mushroom fortified rava idli were 6.8, 7.6, 8.4 and 9.0, respectively in taste and flavour. The table shows that control and fortified samples were significant at the level of 5 per cent in critical difference. The results show that, the mean score value of control sample was same as T_4 sample (9.0). This revealed that both are highly non-significant. It is evident from the table that as level of fortification increased the taste and flavour of products were improved.

Body and texture profile :

It is evident from the Table 1 that the mean score of control sample was 8.0 while the mean value of T_1 (5%), T_2 (10%), T_3 (15%) and T_4 (20%) mushroom fortified rava idli were 7.4, 7.2, 8.0 and 8.8, respectively. The mean value (8.8) of T_4 (20%) sample was higher than the control sample and other samples which revealed that T_4 was better in body and texture than control.

Colour and appearance profile :

Table 1 shows the mean score of control sample was 8.0 whereas value obtained by T_1 (5%), T_2 (10%), T_3 (15%) and T_4 (20%) mushroom fortified rava idli were 7.4, 8.0, 8.2 and 8.6, respectively. The above table shows that control and fortified samples were significant at the level of 5 per cent in critical difference. The table shows that, T_3 (15%) and T_4 (20%) got highest mean score which reveals that they were better than control and other fortified products. It is evident from the table that at the level of fortification 15 per cent and 20 per cent were improved the colour and appearance of fortified products.

Overall acceptability profile :

Table 1 shows the mean score of overall acceptability obtained by organoleptic evaluation between control and fortified sample. The mean score of control sample was 8.3, while the mean value of T_1 (5%), T_2 (10%), T_3 (15%) and T_4 (20%) mushroom fortified rava idli were 7.2, 7.6,8.2 and 8.8, respectively. T_4 (20%) fortified product got highest mean score (8.8) than others means highly acceptable.

The overall organoleptic acceptability (Fig. 1) of different samples of idli shows that 20 per cent mushroom fortified rava idli had better sensory characteristic than control and other fortified idli's samples but 15 per cent mushroom fortified rava idli had good sensory characteristics. Idli is a famous south Indian dish and mostly suggested for children who are often picky eaters and old person because of soft in texture.

Organoleptic Acceptability of mushroom fortified Mathari :

Taste and flavour profile :

Table 2 shows that mean score of control sample was 9.0 while the mean value of T_1 (5%), T_2 (10%), T_3 (15%) and T_4 (20%) mushroom fortified mathari were

Table 1 : Mean score of organoleptic acceptability of mushroom fortified Rava Idli

Sr. No.	Parameters	Mean score of organoleptic evaluation of study group products					Mean	S.E. (d)	C.D.
		Control	T_1	T_2	T_3	T_4			
1.	Taste and flavour	9.0	6.8	7.6	8.4	9.0	8.16	0.25	0.53
2.	Texture	8.0	7.4	7.2	8.0	8.8	7.88	0.25	0.49
3.	Colour and appearance	8.0	7.4	8.0	8.2	8.6	8.04	0.32	0.67
4.	Overall acceptability	8.3	7.2	7.6	8.2	8.8	8.02	0.23	0.49

Table 2 : Mean score of organoleptic acceptability of mushroom fortified Mathari

Sr. No.	Parameters	Mean score of organoleptic evaluation of study group products					Mean	S.E. (d)	C.D.
		Control	T_1	T_2	T_3	T_4			
1.	Taste and flavour	9.0	6.8	7.6	6.6	5.6	7.12	0.30	0.62
2.	Texture	8.0	7.2	8.0	7.2	6.6	7.4	0.42	0.88
3.	Colour and appearance	9.0	7.6	7.6	7.0	6.0	7.44	0.41	0.84
4.	Overall acceptability	8.7	7.2	7.7	6.9	6.06	7.3	0.40	0.84

6.8, 7.6, 6.6 and 5.6, respectively in taste and flavour. The table shows that control and fortified samples were significant at the level of 5 per cent in critical difference. The results show that, the mean score value of control sample was higher than fortified products at different level. But the T_2 (10%) fortified product mean score (7.6) shows better taste and flavor than other fortified products.

Body and texture profile :

Table 2 shows that the mean score of control sample was 8.0 whereas mean value for T_1 (5%), T_2 (10%), T_3 (15%) and T_4 (20%) mushroom fortified mathari were 7.2, 8.0,7.2 and 6.6, respectively. The results show that control and fortified products were significant at the level of 5 per cent in critical difference. It means the body and texture were differed from each other but the mean score of T_3 (10%) fortified sample was same as control sample means both are highly non-significant. It is concluded that at 10 per cent level of fortified sample of mathari had good body and texture quality and with the increasing level of fortification of mushroom powder in mathari the body and texture of product decreases.

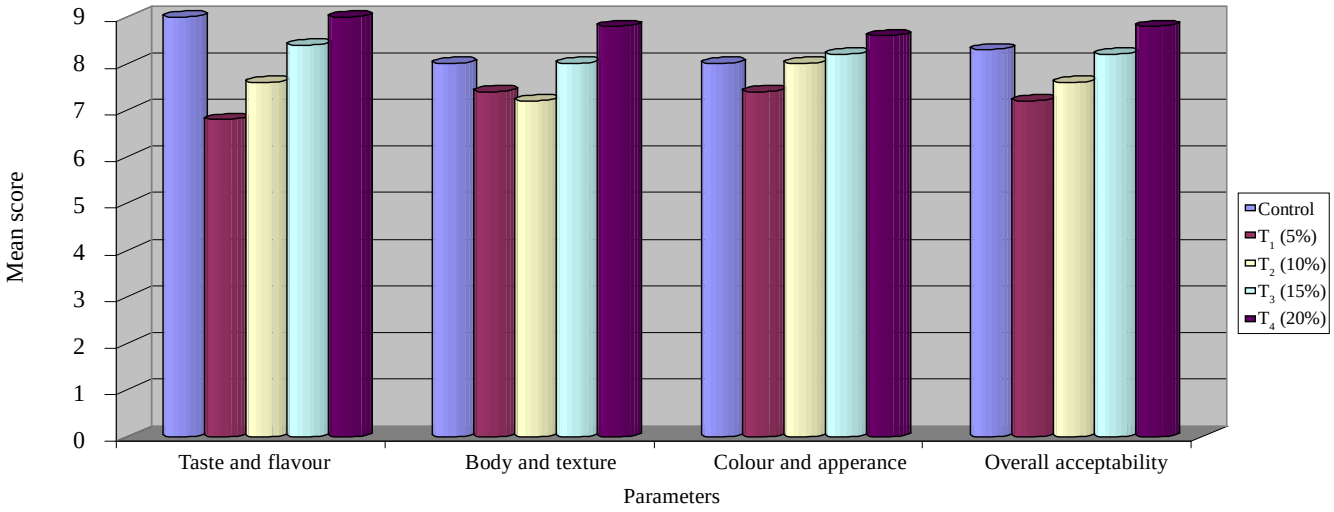
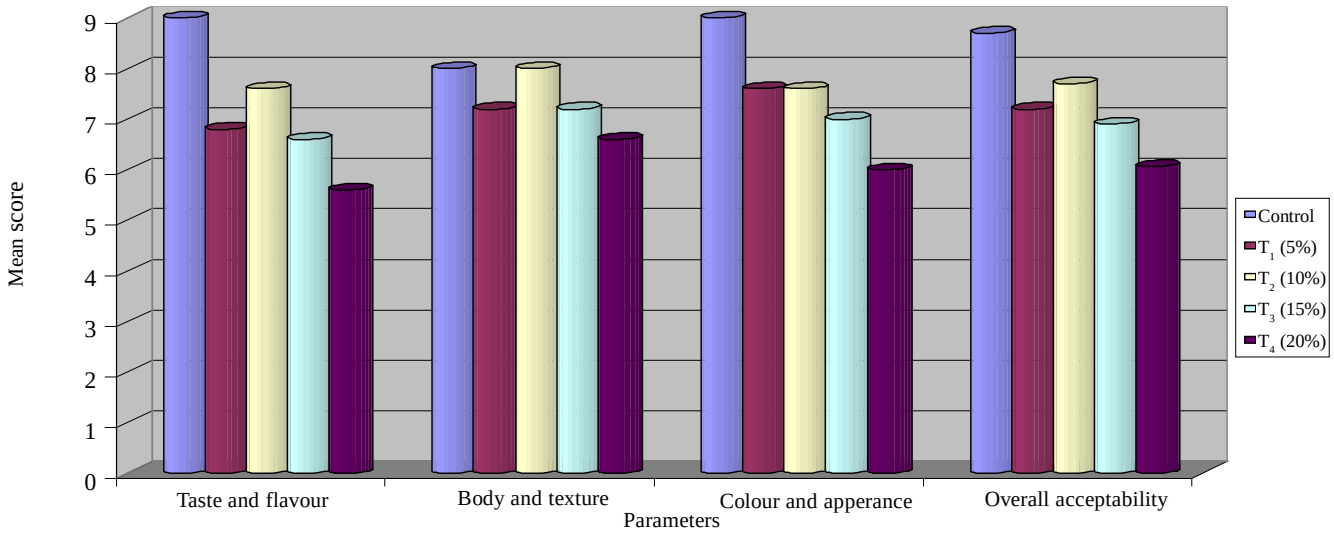


Fig. 1 : Mean score of organoleptic acceptability of mushroom fortified Rava Idli



Note: T_1 and A = 5 per cent Level of mushroom powder fortification, T_2 and B = 10 per cent Level of mushroom powder fortification, T_3 and C = 15 per cent Level of mushroom powder fortification, T_4 and D = 20 per cent Level of mushroom powder fortification, S.E. (d) = Standard error (deviation), NS = Non-significant

Fig. 2 : Mean score of organoleptic acceptability of mushroom fortified Mathari

Colour and appearance profile:

Table 2 shows mean score of control sample was 9.0 whereas mean value obtained by T_1 (5%), T_2 (10%), T_3 (15%) and T_4 (20%) mushroom fortified mathari were 7.6, 7.6, 7.0 and 6.0, respectively. The table shows that control and fortified samples were significant at the level of 5 per cent in critical difference. The results show that, the control sample was better than fortified products at different level. But the T_2 and T_3 fortified product means score were same and shows better taste and flavour than other fortified products.

Overall acceptability profile :

Table 2 shows that the mean score of overall acceptability obtained by organoleptic evaluation between control and fortified sample. The mean score of control sample was 8.7, while the mean value of T_1 (5%), T_2 (10%), T_3 (15%) and T_4 (20%) mushroom fortified mathari were 7.2, 7.7, 6.9 and 6.06, respectively. The result shows that the mean value of overall acceptability of control sample was better than the different level of fortified (5%, 10%, 15% and 20%) mathari.

The overall organoleptic acceptability (Fig. 2) of different samples of mathari shows that 10 per cent mushroom fortified mathari had better sensory characteristic than other fortified mathari's sample. It is concluded that 10 per cent mushroom fortified mathari was highly acceptable in peoples because of its good crispy flavour and texture. In India mathari are widely consumed as snack.

Conclusion :

Organoleptic evaluation of mushroom fortified products was analyzed by panel members. Then it is concluded that 20 per cent fortified rava idli and 10 per cent fortified mathari had better sensory characteristic in flavour, body, texture, colour, appearance and overall acceptability. Early days of civilization, mushrooms were consumed mainly for their palatability and unique flavors. The study suggests that mushroom powder can be used for fortification in Indian traditional recipes because of its exotic flavour and high nutritive value.

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